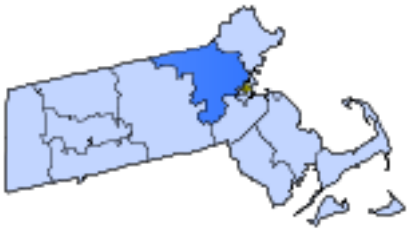
Winchester Culvert Upgrades Prevent Flooding

Full Mitigation Best Practice Story

Middlesex County, Massachusetts



Winchester, MA - Major storm events repeatedly overwhelmed the culverts at Sylvester Avenue and at Canal Street in Winchester, Massachusetts. A 50-year storm event caused flooding and erosion of the culverts in 1996, and in 1998 a 25-year storm damaged the locations. Finally, a 2001 storm brought substantial damage, which led to a hazard mitigation project for the Town of Winchester.

A March 2001 storm first brought snow and then rain to Winchester. As town engineer, Robert Conway describes that, “In the spring, we are very vulnerable to flooding. Since the ground is still frozen, it can’t absorb the rain. The rain mixes with the snow and turned it to slush.” In this storm, the slush developed into a mass that clogged Horn Pond Brook. A large mass of the slush broke loose and as it moved down stream, it gathered debris, limbs, and acted as a massive destructive force.

When the water reached the Sylvester Avenue culvert, the force cracked the sidewalls, washed out the area embankments, and damaged the surrounding pavement. The Canal Street culvert was also negatively affected in similar ways. In addition, the flooding significantly impacted 14 neighborhood homes. A nearby elementary school suffered water damage to carpeting and furniture located in basement classrooms.

The Town of Winchester took immediate protective measures by installing Jersey Barriers to block the pedestrian walkway across the culverts. Concrete blocks were also placed along the eroded embankments as a short-term action to prevent continued erosion. For longer-term hazard mitigation, the culvert openings in this residential neighborhood would need to be enlarged to allow water to pass more easily underneath the streets above.

The Town of Winchester submitted a new design for the culverts in a hazard mitigation grant proposal. The new design was prepared in conjunction with a study that had determined improving the water flow would not consequentially affect flow downstream. “This was part of the ongoing balancing act needed to regulate the flow of water through the town of Winchester,” said Conway.

The proposed fix was to enlarge the culvert capacity by 20 percent. The original culverts were 12 by 10 foot. The new culverts were to be upgraded with pre-cast reinforced concrete, 15 by 12 foot culverts. New headwalls were also to be installed at the entrances and exits of the culverts to prevent erosion and scour. Construction would involve demolition of existing structures, casting new footings and then the installation of new culvert boxes.

With funding from FEMA’s Hazard Mitigation Grant Program (HMGP), a $230,018 grant was awarded. Construction occurred in the summer months and required the bypass pumping of Horn Pond Brook to facilitate installation of the culverts and headwalls. This hazard mitigation project for the Town of Winchester was completed in 2005.

Town Engineer Robert Conway says, “These new structures have kept the water running through Winchester, especially in the spring when the town is vulnerable.” A recent storm tested the new structures and the results were good. The increased capacity of the culverts meant no erosion or damage to the culverts and no flooding in the neighborhood. Now, capable of handling a larger volume of water, the culverts at Sylvester Ave and Canal Street are ready to accommodate the next big storm.

Activity/Project Location

Geographical Area:	**Single County in a State**
FEMA Region:	**Region I**
State:	**Massachusetts**
County:	**Middlesex County**
City/Community:	**Winchester**

Key Activity/Project Information

Sector:	**Public**
Hazard Type:	**Flooding**
Activity/Project Type:	**Flood Control**
Structure Type:	**Concrete, Reinforced**
Activity/Project Start Date:	**04/2004**
Activity/Project End Date:	**07/2005**
Funding Source:	**Hazard Mitigation Grant Program (HMGP)**
Funding Recipient:	**Local Government**
Funding Recipient Name:	**Town of Winchester**

Activity/Project Economic Analysis

Cost:	**Amount Not Available**

Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster?	**Unknown**
Value Tested By Disaster?	**Yes**
Tested By Federal Disaster #:	**No Federal Disaster specified**
Year First Tested:	**2007**
Repetitive Loss Property?	**Unknown**

Reference URLs

Reference URL 1:	**http://www.winchester.us**
Reference URL 2:	**http://www.fema.gov/hazard/flood/index.shtm**

Main Points

- Flooding and erosion to culverts in Winchester, MA caused damage over time.
- A March 2001 storm resulted in a large mass of slush, debris, and limbs and acted as a destructive force.
- Jersey barriers were installed to block the pedestrian walkway and concrete blocks were placed along the embankments as a short-term action to prevent continued erosion.
- As a long-term solution, the culvert openings would be enlarged.
- HMGP helped fund the project, which resulted in no erosion or damage to the culvert and also no more flooding.

Canal Street after Repair

Canal Street after Repair